

AMENDMENTS TO THE CLAIMS

Please amend claims 1, 8 and 16 as follows:

1. (Currently Amended) A robot control device for controlling a robot having a microphone, an imaging device and a self-position detection device, comprising:
 - a voice recognition part for recognizing the designation content of a designator based on sounds collected by the microphone;
 - an image recognition part for recognizing the designation content of the designator based on an image captured by the imaging device;
 - a self-position estimation part for estimating the current position of the robot based on an output from the self-position detection device;
 - a map data base for retaining map data registering at least the position of an obstacle,
wherein the position of the obstacle is recognized by a group of intersections between a plurality of lines from the current position of the robot and the surface of the obstacle;
 - a decision part for deciding whether the movement to a specific position is required based on the recognition result of the voice recognition part and image recognition part;
 - a movement ease decision part for deciding movement ease to the specific position based on the current position of the robot estimated by the self-position estimation part and the position of the obstacle from the map data base responsive to the movement to the specific position being required, wherein the current position of the robot indicates at least one of a warning area, a margin area and a safety area in which the robot exists, and each of the warning area, the margin area and the safety area is set based on the

distance between the current position of the robot and one or more intersections associated with the position of the obstacle;

a behavior decision part for deciding the behavior according to the movement ease decided by the movement ease decision part; and

a behavior control part for executing the behavior according to the decision of the behavior decision part.

2. (Original) The robot control device according to claim 1, wherein the movement ease decision part reads the position of the obstacle surrounding the movement route to the specific position from the map data base, and sets at least two or more areas based on the distance from the obstacle, and the behavior decision part decides the behavior according to an area containing the specific position and an area where the robot exists.

3. (Previously Presented) The robot control device according to claim 1, wherein the movement ease decision part including:

an obstacle recognition part for recognizing the obstacle surrounding the movement route to the specific position from the current position of the robot estimated by the self-position estimation part and the map data;

a warning area set part for setting an area having a possibility to interfere with an obstacle as a warning area when the robot exists, based on the position of the obstacle recognized by the obstacle recognition part;

a margin area set part for setting an area with a predetermined distance from the warning area as a margin area, wherein the predetermined distance is set by a plurality of characteristics associated with the robot; and

a safety area set part for setting an area distant from the margin area as a safety area,

and

wherein the movement ease to the specific position is decided based on the area including the specific position and the area where the robot exists, respectively, applicable to either one of the warning area, the margin area and the safety area.

4. (Original) The robot control device according to claim 3, wherein the warning area set part decides the position of a circle where a distance between representative points of the surface of the obstacle is set as a diameter, and sets the warning area using the position of the circle.

5. (Previously Presented) The robot control device according to claim 1, wherein the behavior decided is one of a group of movement, movement refusal, reconfirmation of designation, stop movement, movement with caution, deceleration and acceleration.

6. (Original) The robot control device according to claim 1, wherein the voice recognition part has a designating range specification part for narrowing a designating area using a reference term, and the behavior decision part recognizes a specific position from the area of the logical product of the designating area narrowed by the designating range specification part and designating area recognized by the image recognition part.

7. (Previously Presented) The robot control device according to claim 1, further comprising a behavior schedule transmission part for outputting a behavior schedule.

8. (Currently Amended) A robot control method for controlling a robot having a microphone, an imaging device and a self-position detection device, comprising the steps of:

recognizing the designation content of a designator based on sounds collected by the microphone;

recognizing the designation content of the designator based on an image captured by the imaging device;

estimating the current position of the robot based on an output from the self-position detection device;

retaining map data registering at least the position of an obstacle from a map data base, wherein the position of the obstacle is recognized by a group of intersections between a plurality of lines from the current position of the robot and the surface of the obstacle;

deciding whether the designation of the movement to a specific position is required based on the designation content recognized by the sounds and the designation content recognized from the image;

deciding the movement ease to the specific position based on the current position of the robot estimated based on the output from the self-position detection device and the position of the obstacle from the map data base responsive to the movement to the specific position being required, wherein the current position of the robot indicates at

least one of a warning area, a margin area and a safety area in which the robot exists
exists, and each of the warning area, the margin area and the safety area is set based on
the distance between the current position of the robot and one or more intersections
associated with the position of the obstacle;

deciding the behavior according to the decided movement ease; and

executing the behavior according to the decided behavior.

9. (Previously Presented) The robot control method according to claim 8, wherein
deciding the movement ease comprises reading the position of the obstacle surrounding the
movement route to the specific position from the map data base, and setting at least two or more
areas based on the distance from the obstacle, and wherein deciding the behavior comprises
deciding the behavior according an area that includes the specific position and an area where the
robot exists.

10. (Previously Presented) The robot control method according to claim 8, wherein
deciding the movement ease comprising:

recognizing the obstacle surrounding the movement route to the specific position from
the current position of the robot estimated based on the self-position detection device
and the map data;

setting a warning area having a possibility to interfere with an obstacle when the robot
exists based on the position of the obstacle;

setting a margin area with a predetermined distance from the warning area, wherein the predetermined distance is set by a plurality of characteristics associated with the robot;

setting a safety area distant from the margin area from the obstacle as a safety area; and wherein the movement ease to the specific position is decided based on the area including the specific position and the area where the robot exists, respectively applicable to either one of the warning area, the margin area and the safety area.

11. (Previously Presented) The robot control method according to Claim 10, wherein setting the warning area comprises deciding the position of a circle where a distance between representative points of the surface of the obstacle is set as a diameter, and setting the warning area using the position of the circle.

12. (Previously Presented) The robot control method according to claim 8, wherein the-behavior decided is one of a group of movement, movement refusal, reconfirmation of designation, stop movement, movement with caution, deceleration and acceleration.

13. (Previously Presented) The robot control method according to claim 8, wherein recognizing the content of a designator based on sounds comprises narrowing a designating area using a reference term contained in the sound, wherein recognizing the designation content of the designator based on the image comprises narrowing the designating area from the image, and wherein deciding the behavior comprises recognizing the specific position from the area of the logical product of the designating area narrowed by the sound recognition and image recognition.

14. (Previously Presented) The robot control method according to claim 8, wherein executing the behavior comprises outputting the behavior schedule.

15. (Canceled)

16. (Currently Amended) A robot control program stored in a computer readable medium and executed by a computer processor for controlling a robot to perform the steps of:

recognizing the designation content of a designator based on sounds collected by a microphone;

recognizing the designation content of the designator based on the image captured by an imaging device;

retaining map data registering at least the position of an obstacle from a map data base,
wherein the position of the obstacle is recognized by a group of intersections between a plurality of lines from the current position of the robot and the surface of the obstacle;

estimating the current position of the robot based on
an output from a self-position detection device,

deciding whether the movement to a specific position is required based on the
designation content recognized by the sounds and the designation content recognized from the image;

deciding the movement ease to the specific position based on the estimated current
position of the robot and the position of the obstacle from the map data based

responsive to the movement to the specific position being required, wherein the current position of the robot indicates at least one of a warning area, a margin area and a safety area in which the robot exists, and each of the warning area, the margin area and the safety area is set based on the distance between the current position of the robot and one or more intersections associated with the position of the obstacle; deciding the behavior according to the decided movement ease; and executing the behavior according the decided behavior.

17. (Previously Presented) The robot control device according to claim 3, wherein the plurality of characteristics associated with the robot includes one of a group of size, shape, function, movement speed and braking distance of the robot.